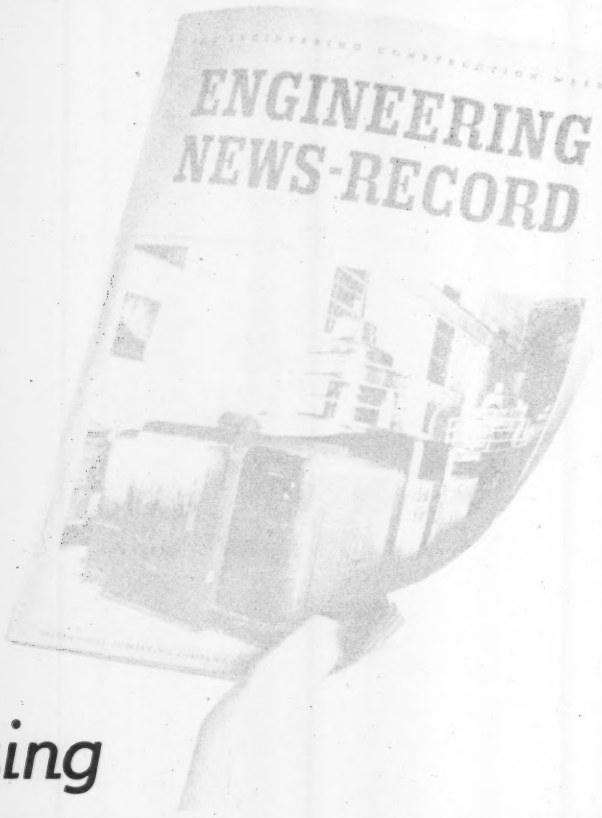
UNIVERSITY OF MICHIGAN
GENERAL LIBRARY
ANN ARBOR MICH 2-C

SEEN



Supposing

WE SOLD YOU THIS PAPER'S SUBSCRIPTION LIST . . . . .

[we wouldn't, but supposing we did]

You, our readers, can appreciate the inherent mobility of engineering construction more readily perhaps than our advertisers, for you are part and parcel of this mobility. Engineers and contractors don't and *can't* stay put. They—meaning you, our readers—wind up a job some place today and start another some place else tomorrow.

Ponder the headaches of manufacturers—our advertisers—keeping your addresses okay on their mailing lists!

During 1938, for example, there were 43,691 subscription list corrections by *Engineering News-Record* due to changes of address and position, deaths, retirements and new subscriptions.

This service to the reader *and to the advertiser* involves mountainous detail. A field and office staff of over 100 perform in a year's time approximately 4,500,000 transactions to keep *Engineering News-Record's* subscription list alive and accurate—to make sure that each issue reaches every one of the nearly 32,000 engineers and contractors who have paid five dollars a year to receive it.

So the most certain way for manufacturers to follow engineers and contractors in their necessary moving around, is to advertise in *Engineering News-Record*. It costs less than third class postage. It's the surest way of maintaining contact with the world's busiest industry (see "Contracts and Capital" and "Construction Reports" in this issue).

ENGINEERING NEWS-RECORD

NEWS

Volume 122 JUNE 15, 1939 Number 24

NOTEBOOK NEWS

Quick Surveys of Construction Events

▶The American Waterworks Association, which is meeting at Atlantic City, began its sessions with the discussion of economic questions of interest to waterworks men. p. 2.

▶A bill now before the House which has administration approval is designed to make more equitable provisions for the repayment of loans from the Reclamation Fund. Tucked away in the bill are provisions that make the Secretary of the Interior all powerful in deciding what reclamation projects shall be built, practically taking that power from Congress. p. 3.

▶No one visiting the New York World's Fair should fail to drive across the new Bronx Whitestone Bridge, not far from the exposition grounds. Few, if any, architectural effects in the fair itself can equal the spectacular modernism of the aluminum-painted towers of this suspension bridge viewed from the roadway, as pictured on p. 622 of our May 4, 1939 issue.

▶Five years ago, when Philadelphia's new post office was completed, its 350x450 ft. flat roof was publicized as a landing field for mail planes. That this was no idle boast will be proved on June 29 when regular transfer mail service from Camden airport, six miles away, will be inaugurated by an Eastern Airlines' autogiro.

▶The cover picture shows the start of work on placing the hydraulic fill for Kingsley Dam on the North Platte River in Nebraska. The dam will be 162 ft. high, nearly 2 miles long, and will contain 25,000,000 cu. yd. of pumped fill.

Photo by Gerald Miller

NEW ASSISTANT COMMISSIONER OF RECLAMATION BUREAU

HARRY W. BASHORE has assumed his duties as assistant commissioner of the Bureau of Reclamation. Since 1933 he has been construction engineer on the Kendrick project in Wyoming. Bashore has been in the employ of the bureau since 1906.

Road Body Offers Jobs To All Texas Graduates

Following a practice initiated last year, the Texas highway department has offered jobs to all engineering students graduating this year from Texas colleges. Forty-eight students, or about 65 per cent of the graduates, have accepted work with the department.

"No attempt to hand-pick the graduates was made," state highway engineer Julian Montgomery said. "It is our opinion that a boy who studies for four years and earns a degree has what it takes to make a good engineer..."

Senate Increases Housing Fund

U. S. Housing Authority is told to develop a housing program for rural areas

The Senate on June 8 authorized the U. S. Housing Authority to borrow and loan to local housing authorities an additional $800,000,000 and to contract for additional subsidies of $45,000,000 annually. The bill, which was introduced by Senator Wagner, must now go to the House for approval.

Introduced and approved in the last minutes before the vote on the bill, was an amendment by Senator Wagner directing USHA to assist local authorities in carrying out projects in rural areas for farm families of low income. "Such assistance," the amendment provides, "may be extended under loan, annual contribution, and capital grant contracts permitting . . . public housing agencies to make long-term leases or purchase agreements or otherwise to rent or sell rural housing to farmers." No provisions as to the mechanism for such rural projects are included in the amendment, but it is specified that all provisions of the Hous-

(Continued on page 3)

. . .

Force Account Adopted On Third Boulder Line

Because all bids submitted for construction of a third transmission line from Boulder Dam to Los Angeles were in excess of estimates, the Bureau of Power and Light of Los Angeles, decided June 9 to reject them all, and build the 258-mi. line by force account. The bureau's estimate for the work was $1,413,000, while the lowest bid submitted was $2,242,000. The 287,500-volt line will be the last to be built by the bureau for the present.

ENGINEERING NEWS-RECORD—Published every Thursday by McGraw-Hill Publishing Company, Inc. Publication Office, 99-129 North Broadway, Albany, N. Y. Editorial and Executive Offices, 330 W. 42nd Street, New York, N. Y., James H. McGraw, Jr., President; Howard Ehrlich, Executive Vice-President; James H. McGraw, Honorary Chairman; Mason Britton, Vice-Chairman; B. R. Putnam, Treasurer; D. C. McGraw, Secretary; J. E. Blackburn, Jr., Circulation Manager. Subscription rates in the United States, Canada, Mexico, Central and South American countries, $5 a year; all other countries, $9, or 36 shillings a year. Entered as second-class matter October 29, 1936, at the Post Office at Albany, N. Y., under the Act of March 3, 1879. Printed in U. S. A. Copyright 1939, by McGraw-Hill Publishing Company, Inc. Cable address: McGRAWHILL, New York. Member A.B.P. Member A.B.C.

Wage Policy Attacked By A.W.W.A. Meeting Speaker

Extension of social security to cover waterworks employees by amendment or local plans urged

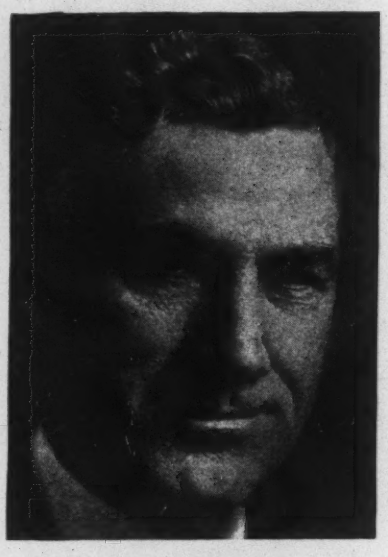
Two phases of the economic outlook for public employees were brought into sharp focus at the American Water Works Association meeting in Atlantic City June 12–14, when Leo Wolman, economist, discussed labor relations and Dale L. Maffitt, general manager of the Des Moines, Ia. Waterworks, spoke on social security. With registration approaching the 1,000 mark at the close of the first day, attendance at the 59th annual convention of the association promised to exceed all previous records.

The new president is J. Arthur Jensen, supervisor of the Water Works Department, Minneapolis; he succeeds Reeves Newsom, consulting engineer, New York. Norman J. Howard, Toronto, Can., is vice-president and W. W. Brush, New York, is continued in office as treasurer.

Elected to honorary membership in the association were: Frank A. Barbour, consulting engineer, Boston; Carleton E. Davis, manager, Philadelphia Suburban Water Co.; Charles Gilman Hyde, professor of sanitary engineering, University of California; Beekman C. Little, secretary emeritus of the association; Harry E. Jordan, secretary of the association.

The John M. Diven medal award, presented to the member who has rendered outstanding service to the association during the year, was given to Hal F. Smith of Detroit, for the part he played in the preparation of the manual of waterworks accounting. The John M. Goodell prize, a cash award established by *Engineering News-Record* as a memorial to a former editor, was awarded to David G. Thompson and Albert G. Fiedler for a paper dealing with legal control and use of groundwater.

Because the social security act specifically exempts municipal waterworks employees from participation in old age insurance benefits, it should be amended said Maffitt. Unless group action is taken now, changes in the act to include waterworks employees may be far in the future. It may be desirable, therefore, to consider means by which waterworks employees' retirement and pension plans can be formulated. It was suggested that small municipalities which lack the resources to establish a workable plan might participate in a state retrement system, or join with other local units in a combination plan. Still another method would be to purchase group insurance.



J. Arthur Jensen
New President of A.W.W.A.

Reeves Newsom
Retiring A.W.W.A. President

A sound labor relations system, said Leo Wolman, professor of economics at Columbia University, is directed toward two objectives, *viz.*: Machinery for swift and equitable adjustment of grievances, and attainment of good working conditions. These objectives should be easy of attainment but in practice prove to be otherwise. The National Labor Relations Act in its present application, he said, has been more directly an instrument of national policy to increase wages. This latter being part of the aim to increase purchasing power through munipulation of wage rates and public spending. Experience, he asserted, has not demonstrated the success of this policy.

Extensive studies by Wolman show that while wage rates have gone up, the volume of business has gone down. "Maybe the economic system of the United States can be run this way," said Wolman, "but I doubt it." Supporting his claim that there has been a serious lack of mutual adjustment between wage rates and business volume since the early nineteen thirties, he reported that studies of our national production at the peak of successive cycles from 1899 to the present revealed that for the first time the cycle 1929-37 failed to bring an increase in total production. Yet in this period real wages rose 50 per cent while the highest prior rise is 20 per cent in the twelve years 1914-20.

Concerning the huge public expenditures that have been made, Wolman said that we are passing through "a dangerous waiting period, waiting to see what public spending will do." It was his conclusion that this country has extended itself beyond the safe limit to which an economic system can be stressed. Wolman predicted a decline in civil service employment along with a lag in wage rates.

Highlighted in the technical sessions was the announcement of a new method for calculating the thickness of cast iron pipe. This development of Committee A 21 of the American Standards Association was presented by W. D. Moore, President, American Cast Iron Pipe Co., Birmingham. The new technique of design establishes a method by which the strength properties of cast iron pipe to resist the combinations of forces encountered in service may be determined. Other papers in the technical sessions will be reported in next week's issue.

• • •

Typhoid Attacks 83 In Washington Town

Eighty-three people have become sick in an outbreak of typhoid fever at the town of Sequim, Wash.; there have been no deaths. Red Cross, state, and county officials are attempting to immunize all persons in the neighborhood of the epidemic.

One of the sick is a school teacher, and the rest are school children; the epidemic is tentatively attributed to lack of refrigeration in a school lunchroom.

New Repayment Plan For Reclamation

Repayment would be based on crop returns and project authorization method changed

A bill authorizing the Secretary of the Interior to revise reclamation repayment contracts with water users to permit variation in the annual payment according to the variation in the crop return on the reclamation project area has been introduced into the House by Representative White, chairman of the House irrigation and reclamation committee. Passage of the bill has been recommended in a letter to Congress by Secretary of the Interior Ickes.

On each project, the Secretary will determine a normal crop return, based on twelve years experience, if this is available, or on experience with similar projects if twelve-year records are not available. In any given year, for each per cent by which the actual crop return is greater or less than the normal crop return the repayment charge will be increased or decreased by 2 per cent.

No annual payment may be reduced to less than 15 per cent of the normal payment.

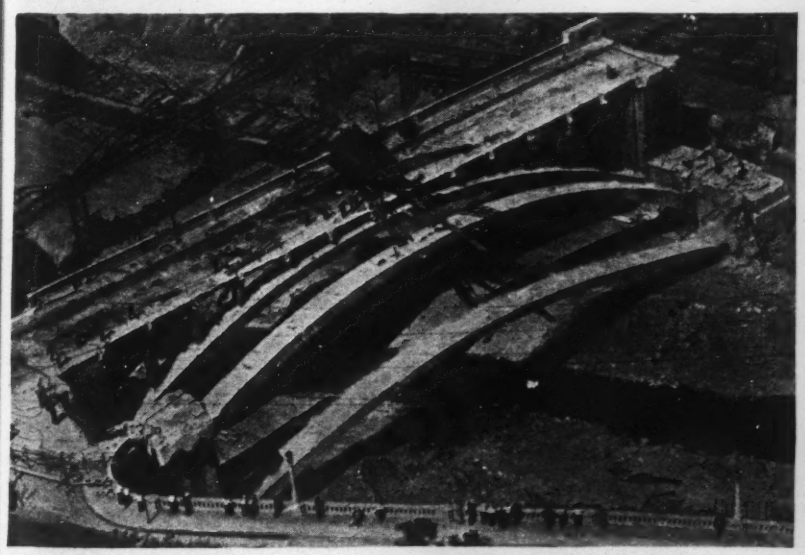
The necessity for Congressional authorization of individual reclamation projects would be eliminated under certain conditions by the proposed bill. It is provided that on every proposed project the Secretary of the Interior investigate the engineering feasibility and cost of the work and allocate to irrigation, power, and municipal water supply and other miscellaneous purposes a proper proportion of the cost. The Secretary may also allocate to flood control or navigation any part of the total estimated cost which he finds to be proper.

Secretary decides

If the amount which the Secretary finds to be repayable by water users, power users, and municipal water supply users, plus the amount allocated to flood control, is as great as the estimated cost of the project, then the new project "shall be deemed authorized and may be undertaken by the Secretary." If the repayable amount plus the flood control allocation are not equal to the total cost, then the project must be authorized by act of Congress.

A somewhat ambiguous section of the act appears to permit the Secretary, at his discretion, to carry out a project without entering into a repayment contract, entering instead into contracts to furnish water for irrigation at rates which must cover operation and maintenance and "an appropriate share of such fixed charges as the Secretary deems proper."

The Boulder Canyon project is specifically exempted.



DYNAMITE CHARGES BRING DOWN ARCH

DEMOLITION of the Dayton Ave. bridge over the Los Angeles River was completed by the U. S. Engineers June 7 as part of a project to straighten and enlarge the river channel at this point to prevent flood losses. The Dayton Ave. Bridge, built in 1927, was 530 ft. long and 71 ft. wide. The main arch span shown above was 185 ft. long. The original cost of the structure was $295,000.

After the deck structure had been removed from two of the four 7-ft. arch ribs, small charges of dynamite were then placed at each end of the ribs, when fired, the arches dropped.

Minority Proposes Changes in WPA

Bill would assign administration to states and set up fund-allocation formula

A bill which may be assumed to represent the Republican position on the administration of work relief was introduced into the House on June 7 by Representative Taber. The bill would provide for federal grants to the states to be partially matched from state funds.

Calling for an appropriation of $1,250,000,000 for the year ending June 30, 1940, the bill would create a new agency, the Unemployment Relief Administration, to wind up the affairs of the WPA. The new URA would make monthly grants to the states, which would be required to put up from their own funds an amount equal to half the federal grant. Grants would be allocated in amounts based 25 per cent on the population of the state, 50 per cent on the number on relief in the previous month, and 25 per cent on the total relief expenditures in the state during the previous fiscal year.

Forbidden would be employment of aliens, of men who had refused to take employment, or of men who had not "made a reasonable effort" to obtain work. Any relief worker who had been on a relief project for twelve months would be removed from the project and returned to the bottom of the list of eligibles. Persons taking temporary jobs would retain their position on the list.

• • •

Senate Increases Housing Money

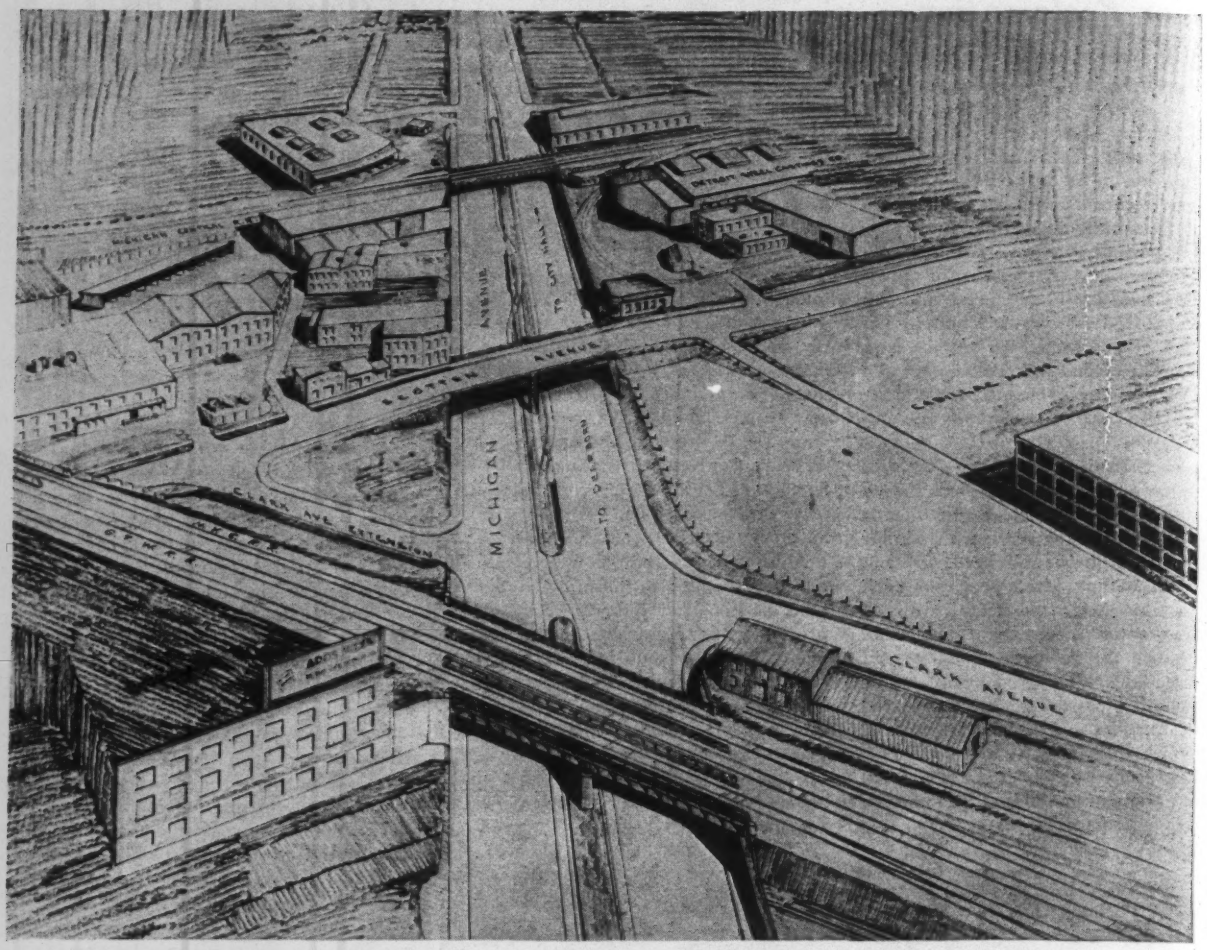
(*Continued from p.* 15)

ing Act of 1937 shall apply "insofar as applicable."

The additional $45,000,000 of annual subsidies, it was pointed out in debate, is sufficient to provide subsidies for projects undertaken with the new loan authorization of $800,000,000 and also for projects to be financed from $150,000,000 remaining from the authority's previous authorization, which it has been unable to loan because it has no unobligated subsidy money. In addition, the new subsidy authorization will permit USHA to subsidise rents on projects built by the former housing division of PWA when and if USHA sells the projects to local authorities.

Obligations of local housing authorities are made permissible investments for national banks under another provision.

Detroit Underpass Construction Will Start in July



CONSTRUCTION will begin in July on the Detroit million dollar Michigan Ave. grade separation and widening project, shown in the above architect's drawing. The present, narrow, rough street will be made into a wider, depressed dual road for 1,700 ft., and two railroad overcrossings will be replaced. Scotten Ave., now at grade, will be carried over the depressed way, while Clark Ave. will be extended to provide access to and from Scotten Ave.

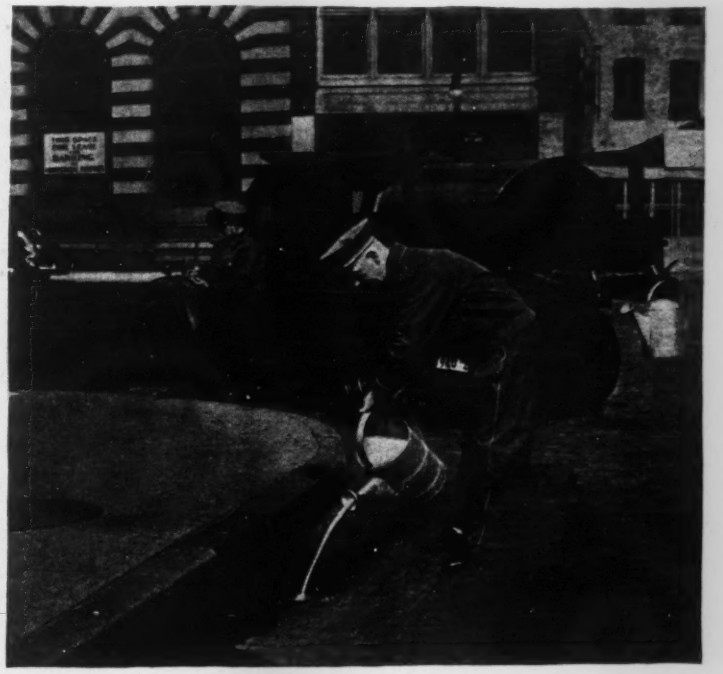
THE PRESENT plate girder crossing of the Michigan Central R.R. over Michigan Ave. will be replaced by a two-span bridge.

WORK on what will be the largest grade separation in Detroit will begin next month. The job entails depressing and widening 1,700 ft. of Michigan Ave., replacing two railroad underpasses and adding a street overpass; it is scheduled for completion in August, 1940.

A feature of the project will be the use of gray sandstone blocks for facing the bridge and retaining walls. Engineers feel that this will not be as easily defaced as the smooth concrete recently used on other projects by the highway department. Cost of the project will be about $1,000,000 of which the federal government will provide about $825,000. Murray D. VanWagoner is state highway commissioner.

Protecting New York From the Mosquito

WITH the coming of late spring and early summer in the New York metropolitan area, millions of mosquitoes end their cold-weather inactivity in order to annoy millions of people; at least, they do this if the department of sanitation doesn't annoy them first. In addition to activities pictured on this page, a force of more than 3,000 WPA workers is installing drainage ditches which will cut down the need for swamp spraying. These WPA projects have been approved for a total of $5,412,000 for 1939.



SEVENTY-FIVE THOUSAND of these sewer catch basins must be sprayed once a week so that New York's residents will not suffer attacks from swarms of mosquitoes. In this illustration, one department of sanitation worker pours a pyrethrum extract emulsion into a catchbasin, while another records the location of one nearby.

TAKING A SAMPLE of water for examination to determine presence of mosquito larvae and to test effectiveness of abatement measures. Mosquito traps have shown the presence of a small percentage of malaria-transmitting mosquitoes; a scarcity of human carriers keeps the disease from becoming epidemic.

SPRAYING LARVICIDE on low, swampy ground is a major activity of the mosquito fleet. Here a 3-ton truck equipped with pumps and a 500-gal. tank, is being used to supply a nozzle which throws a stream of about 100 ft. There are 12 of these units in use. More than 3,200 mi. of ditches are maintained by the city for drainage of such swamps, and an additional 350 mi. of upland fresh water ditches have been built.

A.G.C. Moves Toward Practice Standards

Board authorizes negotiations with AFL for better construction labor relations

Cooperation with other branches of the industry was the principal theme of spring board meeting of the Associated General Contractors of America, held in St. Paul, June 5-7. The board started development of fair trade practice standards for all divisions of the construction industry, and authorized negotiations with the Building and Construction Trades Department of the American Federation of Labor and its international unions to formulate a plan of cooperation for bettering construction labor relations.

At the 1939 convention of the association, held in San Francisco in March, initial steps in this direction recommended plans for fair trade practice standards for the building division of the industry. Also, the convention started plans for removal of objectionable trading conditions, which some groups within the industry have already endeavored to remedy by legislation for federal regulation of the handling of the bids of subcontractors and material suppliers.

Staff authorized to proceed

The managing director and his staff were authorized by the board to proceed with development of fair standard practices. The intention is to work out possible methods for correcting existing bad practices, with the approval of the government, rather than wait for corrective action to be applied through legislation or mandatory regulation by governmental agencies. Through conference with government officials and agencies in the development of fair trade practices, it is planned to work out a yardstick by which construction practices may properly be measured.

The March convention had also recommended development of certain standard provisions to be used in labor agreements that would rectify some of the uncertainties now existing, and also to develop a plan for greater stability of wages, hours and working conditions on a project under construction, the prompt settlement of jurisdictional disputes without the stoppage of work, uniform hours for all crafts on a project, and provision for training apprentices in the skilled crafts. Action of the board in St. Paul specifically authorized conferences between a committee of the A.G.C. representing members employing union labor, and the Building and Construction Trades Department of the A. F. of L. to develop a plan of cooperation with the specific understanding that any agreements resulting from such plan shall be binding only on those members, chapters or groups of members who may subscribe to such agreements.

The call of President Guy F. Atkinson to the meeting brought an unusual response, and representatives from practically all of the larger construction regions of the United States were in attendance. Managing Director Edward J. Harding, of Washington, in his spring report to the board, discussed the more pertinent situations confronting the industry at the present time.

Legislation proposed and opposed

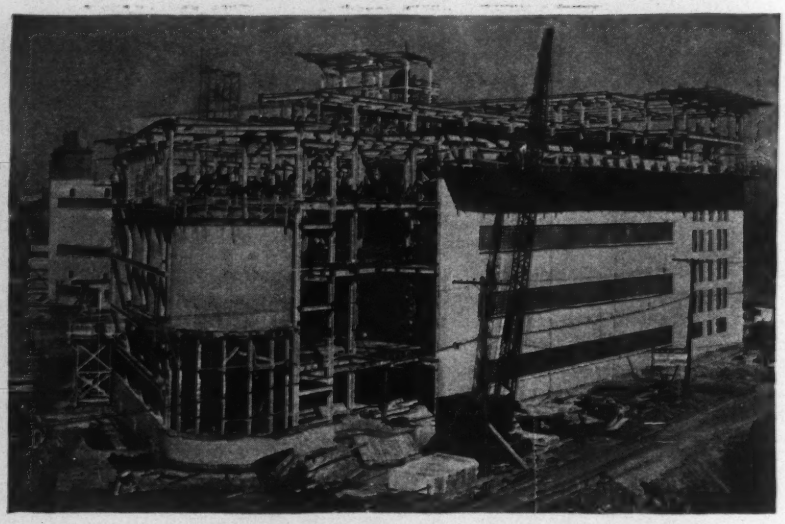
George B. Walbridge, of Detroit, reported on legislation, resulting in active discussion of the Fair Labor Standards Act, and the so-called "Subcontractors' Bill" intended to regulate bid shopping and bid peddling. A resolution adopted by the board directed the national staff to continue its opposition to last measure, considered contrary to the public interest, and if legislation is essential, propose legislation which will alleviate the practices complained of and yet serve the public interest.

Discussion of the wage and hour provisions of the Fair Labor Standards Act indicated that association members do not believe Congress intended to include the operations of the construction industry under the act. However, they recognize the danger of assuming all types of construction operations were outside of the act because of the numerous interpretations which have been issued, and a complete lack of court decisions which might serve as a guide as to its application.

The report to the board with reference to the status of public works appropriations by the federal government pointed out the necessity of continuing public works if the industry is to hold such small gains as it has made toward restoration to normal. The report shows that the appropriations thus far made by Congress, together with all of the measures now pending, if they do pass, would create a public works market for the fiscal year of 1940 of about the same volume as prevailed in 1939, provided the Public Works Administration is furnished funds to permit the continuation of the non-federal public works program equal to that of the 1939 fiscal year.

National staff report

Managing Director Edward J. Harding made a special report on the activities of the national staff, chapters and branches in cooperation with the committee of Congress investigating the activities of the Works Progress Administration, as well as the support given to a continuation of the Public Works Administration program. The meeting endorsed these activities and instructed the staff to continue its efforts to limit WPA construction to projects minor in character, as well as restrict that organization in its purchases of equipment to that costing less than $500.



A BUILDING FOR BAKING SODA

PROMINENT among modern trends in building construction are the increased use of structural welding, the growing popularity of glass blocks, and wider adoption of air conditioning. The new plant which Church & Dwight, Inc., is building in Syracuse to house production of its Cow Brand and Arm and Hammer baking sodas follows all three trends. The building was designed and is being built by The Austin Co. of Cleveland.

Second Caisson Landed For Narrows Bridge at Tacoma

The unprecedented feat of sinking a 65x116-ft. caisson 122 ft. in 25 days in tidal currents of 12 m.p.h. was successfully completed on June 9 when the caisson for Pier 5 of the Narrows Bridge at Tacoma, Wash., was landed on the bottom. Pier 4 caisson, for the west tower of the bridge, was landed in 110 ft. of water and tidal currents of 8 m.p.h. several weeks ago.

Both caissons were fitted with collapsible bottom doors to be opened after landing for dredging through 32 pockets. Pier 5 will be carried down to El. —200, or about 78 ft. into the bed of the bay; Pier 4 goes to El. —162. The caissons are built up of 3 ft. 3 in. concrete outer walls, sheathed with 8x12-in. timbers, and 2-ft. concrete cross walls. Two guy derricks, carried on steel frames, place concrete and remove muck. Concrete is placed in 12-ft. lifts; derricks are jumped in 12-ft. stages. The caissons are anchored to 570-ton concrete anchors—24 on Pier 4, and 28 of them on Pier 5.

The Narrows Bridge is being built by the Washington Toll Bridge Authority; Lacey V. Murrow, chief engineer; Clark Eldridge, bridge engineer; C. E. Andrew, consulting engineer. The general contract is held by Pacific Bridge Co., General Construction Co. and Columbia Construction Co., combined. Ralph T. Keenan is general manager, A. E. (Jack) Graham is superintendent and Theo. M. Kuss is chief engineer for the contractor.

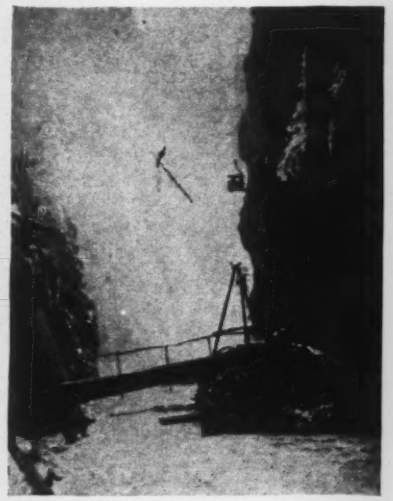
• • •

Flood Causes Little Delay To La Tuque Power Project

The flood of May 10 in the St. Maurice River which washed out part of the cofferdam of the power project now under construction near LaTuque, Quebec, caused little delay to the work, according to J. A. McCrory, vice-president and chief engineer of the Shawinigan Engineering Co., which is building the project for the St. Maurice Power Corp. About 130 ft of cofferdam was destroyed, the crib foundation of one derrick washed out and the derrick fell into the river but suffered little damage. The total loss is put at less than $25,000. The damaged cofferdam was restored early in June.

A picture of the flood was published in our issue of May 25, p. 695. The caption of that picture was in error in stating that the project is being built by the Quebec government.

The development will be completed early in June. It will have a capacity of 160,000 hp at 104-ft. head.



CAGED SURVEYORS

SURVEYORS taking topography at the site of Mud Mountain Dam in Washington worked from a cage hung from a cableway spanning the rocky gorge. On the axis of the dam the canyon walls are precipitous for some 200 ft. above the streambed.

Engineer's Name Proposed For Mud Mountain Dam

If a bill now before Congress is passed, Mud Mountain Dam (*ENR* May 18, 1939, p. 684) will be called Isaac Ingalls Stevens Dam. Stevens was a member of the Corps of Engineers and was the first territorial governor of the State of Washington. He graduated from West Point just a hundred years ago and entered the Corps of Engineers, serving until 1853 when he became territorial governor. Stevens' first task was to explore the territory from St. Paul to Puget Sound.

First advertisements for bids on the Mud Mountain Dam project will appear July 1. The first job will be construction of the diversion tunnel, which is scheduled for completion in May or June of next year.

Construction of the dam in the deep gorge shown above will require ingenuity, as the earthfill construction machinery and materials will probably have to be lowered from the rim.

Assisting the army engineers in the design is a consulting board consisting of C. H. Howell, Bureau of Reclamation; W. P. Creager, Buffalo consulting engineer; and Professor Glennon Gilboy, Massachusetts Institute of Technology. Army personnel participating in the work includes William H. McAlpine and Thomas A. Middlebrooks of the Chief of Engineers' office in Washington and Col. Herbert J. Wild, district engineer at Seattle.

Contract Is Awarded For Shasta Cement

Grand Coulee cement bids again postponed—Shasta aggregate bids opened

The Procurement Division of the Treasury on June 10 awarded an $11,026,000 contract to the Permanante Co. of Simla, Calif., to furnish 5,800,000 barrels of low-heat portland cement over a four-year period for use in the Shasta Dam of the Central Valley Project. The cement is being supplied at a delivered cost to the government of $1.90; Permanante's bid f.o.b. mill was $1.19. The Permanante company plans to build a mill to fulfill the contract, and the award has been held up for some weeks while a decision was reached as to whether this arrangement is legal. A syndicate of six cement companies had submitted a joint bid 25 to 45 cents higher than Permanante's, depending on the rate of delivery.

Grand Coulee cement

Opening of bids to furnish cement for the Grand Coulee Dam, already postponed once from June 1 to June 9, has again been deferred until June 16. It is understood that the Procurement Division wanted to wait until after the Shasta award to open these bids, presumably to give unsuccessful bidders on Shasta an opportunity to bid on Grand Coulee.

Bids were opened June 9 by the Bureau of Reclamation for furnishing 10,200,000 tons of sand and gravel concrete aggregate for use at Shasta Dam. Three bids were submitted on the basis of using a gravel deposit at Redding, Calif., of which the lowest was $4,414,000, submitted by Columbia Construction Co.

On the basis of using a deposit near Cottonwood, the Redding Trading Corp. offered the low bid of $4,542,000. In addition to the amount of the bid, the award of the contract will be influenced by the cost to the government of acquiring gravel rights, rights of way for railroad spurs, and the cost of transportation. Unit prices on the aggregate vary from 41.88 cents to 53 cents a ton for gravel and from 36 to 53 cents a ton for sand.

Colorado-Big Thompson bids

The Bureau of Reclamation opened bids June 7 on construction of the Continental Divide tunnel of the Colorado-Big Thompson project. This is a 13.1-mile tunnel with a diameter of 9½ ft. The Shasta Construction Co. of San Francisco bid $10,759,000, while Root & Brown, Inc., of Houston, offered the only other bid at $12,507,000.

They are building Hiwassee Dam for the TVA. Project engineer, **C. E. Blee,** can afford the pleased smile, and construction engineer, **Olaf Laurgaard** the satisfied mien, because of the rapid progress being made. The 25 years of dam-building experience in the West, of which each of them can boast, is a valuable TVA asset. **James E. Walters** (right), construction superintendent, is the man behind Hiawassee's gun of progress. Walters was formerly construction superintendant for Pickwick Landing Dam. Before this he did considerable construction work in the lower Mississippi River valley.

J. D. Jacobs, Photo

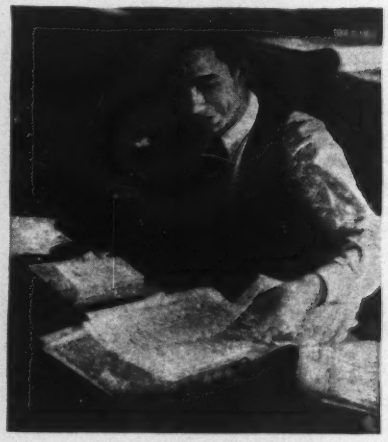
Four tunnel drivers come up for a little sunshine at Shaft 19 on the Associated Contractors, Inc., job on the Delaware River Aqueduct tunnel. Probably **E. H. Hatch,** left, general tunnel superintendent for Associated, is telling the rest of the boys that, although their progress was the best on the 85 miles of aqueduct last week, it ought to be a damnsight better next week. Listening to him, arranged from left to right, are **William Harrison,** walking boss at Shaft 19; **Lester E. Huntington,** tunnel superintendent at 19; and **Geo. Underwood,** formerly walking boss for Associated but recently made superintendent for Walsh Const. Co. at Shaft 4.

MEN AT WORK

Pleased with progress on construction of the Hackensack, N. J. sewage disposal plant are **Lee Campbell,** director of public works, and **M. Hauck,** superintendent for the Industrial Engineering Co., contractors on the job. Campbell designed the plant—a 4.5 mgd activated sludge unit—in addition to carrying on with his other duties as public works administrator in this 29,000 population New York suburb.

George F. Catlett, chief engineer of the Florida State Department of Health, who is leading an aggressive attack on malaria control in his state. "This is a job for engineers," he says, pointing to a new type of precast concrete lining for drainage systems which was developed by H. D. Peters, city sanitary engineer of Jacksonville, to insure better mosquito control for the city.

Howard W. Niemeyer looks over records of the distribution system of the Indianapolis Water Co. which on May 1 promoted him to be superintendent of distribution to replace Charles W. Winkle who has retired after 46 years service. Entering the company as a draftsman he was transferred after 3 years to the distribution system where he made an exhaustive study of meters. (*ENR* Nov. 10, 1938, p. 593.)



LABOR NOTES

NEARLY ALL major building operations in Washington, D. C. were at a standstill this week as a result of a carpenters' strike. Laborers, who struck the week before, were still out at that time. Carpenters are demanding an hour a day less and a dollar a day more, though a tentative agreement to the wage increase alone has been reached on one job in the capital. Laborers are asking 80c per hr. for common labor and 85c per hr. for semi-skilled labor. The old rate is 70c.

THE FEDERAL COURT in St. Louis, June 2, dismissed suit by eight St. Louis painting contractors to enjoin the Brotherhood of Painters, Decorators and Paperhangers of America from enforcing a section of the union's constitution requiring the contractors to pay the St. Louis wage scale of $1.50 per hr. when engaged outside the St. Louis area. The court held that the contractors are not engaged in interstate commerce and that enforcement of the union provisions does not materially affect interstate commerce or result in unlawful discrimination.

DESPITE a strike of two hundred truck drivers, laborers and other workers, construction work was not halted June 1 on the $3,000,000 Connecticut State Hospital at Southbury. The strike was called as a result of the hiring of two non-union truck drivers.

• • •

Robins Made Assistant To Chief of Engineers

Colonel Thomas M. Robins has been appointed to the post of assistant to the Chief of Engineers and has been elevated to the rank of brigadier general. In his new post he will succeed Brigadier General Max C. Tyler, recently nominated as president of the Mississippi River Commission.

General Robins, who is 58, has been stationed since last June at Fort Belvoir, Va. as commandant of the Engineers School there. For four years previously he was division engineer at Portland, Oregon, having general supervision over the Bonneville project, and between 1929 and 1934 he was division engineer at San Francisco. He was appointed to the rank of colonel in 1935.

Earlier Robins had been assistant engineer at Providence and had served frequently in the engineer office at Washington. He was a member of the Board of Surveys and Maps in 1921, and of the Board of Engineers for Rivers and Harbors in 1928–29 and since last June.

Kansas City Abandons State Line Sewer

Acting on the recommendation of the Forward Kansas City Committee, a group of civic leaders which took an active part in the reorganization of the Kansas City government after the indictment of Thomas Pendergast, Mayor Smith has ordered abandonment of the state line sewer project.

The job is a 7,218-ft. long 30-in. sanitary sewer, following the state line between Kansas and Missouri in tunnel at depths ranging up to 85 ft.

The Forward Kansas City Committee had submitted to the Mayor a report of its engineering committee which contained a finding that there is no justification for construction of the state-line sewer. The report pointed out that the area to be served by the proposed sewer is already adequately served by an existing sewer line located in Kansas but owned by Kansas City, Mo.

The proposed sewer is being built as a WPA project, and about $127,000 has already been spent, of which the committee estimates that $13,000 is in salvageable material. At least $298,000 more will be necessary to complete it, the engineers estimated, whereas the project can be permanently closed down at an expenditure of $6,000 to block off the shafts with concrete mats.

• • •

Roy C. Gowdy Dies At Age of Sixty

Roy C. Gowdy, chief engineer of the Colorado & Southern Ry. at Denver, died suddenly June 10 of heart failure, aged 60.

Gowdy studied for about a year at Colorado College and obtained his first engineering job in 1899 as rodman and assistant engineer on the Colorado Southern & Cripple Creek District Ry. He worked for a short time for the Denver & Northwestern and in 1906 became resident engineer and later chief engineer of the Fort Worth and Denver City Ry.

Twelve years later he joined the Colorado & Southern as corporate chief engineer and became chief engineer in 1920, a position he held until his death. He was a past vice president of the American Society of Civil Engineers.

• • •

Cincinnati Upholds Proportional Voting

Cincinnati voters last week decided to maintain in the state charter the provision for election of the city council by proportional representation, in force since 1925, by the narrow margin of 47,558 to 48,300.

WASHINGTON HIGHLIGHTS

Special reports by Paul Wooton

THE TWO PLANS for reorganization of the federal government which were drawn up by the President and approved by Congress and which include provision for a new Federal Works Agency will go into effect July 1, under the terms of a bill which has been signed by President Roosevelt.

LELAND OLDS has been nominated by the president to fill the post on the Federal Power Commission which has been vacant since October, 1937, when Chairman Frank R. McNinch went on leave of absence to head the Federal Communications Commission. Olds' appointment runs until June, 1944. He is secretary of the New York State Power Authority and has long been an advocate of construction of the St. Lawrence seaway with its large power plants.

MINIMUM annuities for employes of the Panama Canal or the Panama Railroad Co. who worked for at least three years on construction of the canal are established in a bill passed by Congress which also extends the thanks of Congress to such employes. Employes who have retired, the bill provides, shall receive an annuity not less than 2 per cent of their average pay during any five years multiplied by their years of service in the Canal Zone.

• • •

Resident Road Engineers Named in Wyoming

Continuing the reorganization of the Wyoming highway department, begun early this month (*ENR*, June 8, 1939, page 750), ten resident engineers have been appointed for various localities in the state. Prior to June 1, the state was divided into five more or less autonomous districts; these districts have been abolished, and the resident engineers will report directly to Cheyenne headquarters.

The newly appointed resident engineers are: William Sutton, Rock Springs; Jess Graham, Sheridan; Ray Bromley, Basin; Jerry DeFord, Newcastle; W. J. Schilling, Casper; Charles Garrd, Lander; Henry Jacques, Kemmerer; John Ingram, Rawlins; Gardner Manfull, Laramie; and Jack Lloyd, Cheyenne.

J. R. Phillips, formerly district engineer at Basin, has resigned, effective July 1.

OBITUARY

JOHN R. FORDYCE, 69, of Hot Springs, Ark., died there June 9. During the World War, Fordyce served as a major in the Engineers Corps, and in this capacity he supervised construction of Camp Pike, now Camp Robinson, at Little Rock. After the war, he went into private practice, supervising several Mississippi River terminals. He was graduated from Washington University in 1892, and later from the Harvard Graduate School.

OSCAR C. STUPP, a civil engineer, died in St. Louis May 31 at the age of 39.

CHARLES HUDSON BIGELOW, recently with the New Jersey state highway department, died in Plainfield, N. J., June 10 at the age of 73.

WILLIS GUNN, 33, Longview, Tex., civil engineer, died there June 5.

CARLETON SCOTT, engineer with the Woonsocket, R. I., public works department, died June 11 in Northfield, Vt. He was a graduate of Norwich University.

WILLIAM WINTERS, 52, of the Louisville U. S. Engineer Office, died in Indianapolis May 31. He was in Indianapolis to inspect materials to be used in a proposed federal flood control project.

DANIEL A. O'NEILL, 79, Cleveland construction contractor, died there May 29. In the 1880's he was a street commissioner of the Ohio city.

W. H. HALE of Natchez, Miss., railroad contractor, died there recently at the age of 75.

WALTER C. BUETOW, 54, former state highway engineer of Wisconsin, died recently in Milwaukee.

FREDERICK FRELINGHUYSEN DUMONT, former construction engineer for the Pennsylvania Railroad, died at Ronks, Pa., June 4. Dumont, who was 70, built the railroad bridge across the Susquehanna at Columbia, Pa.

OTTO MEYER, 81, who used to be a structural engineer with American Bridge Co., died June 3 in Chicago.

CLIFFORD W. HAM, executive director of the American Municipal Association, died June 9 in Chicago. He was graduated in 1921 from the University of Michigan, and at one time was city manager of Pontiac, Mich. He was 46 at the time of his death.

Semester System Dropped at Thayer

Effective next fall the conventional system of carrying a considerable number of courses throughout a semester will be dropped at the Thayer School of Civil Engineering, graduate engineering school connected with Dartmouth College. The school will return to the system in effect before 1925 under which the students will carry only two courses at a time, shifting to other subjects when those courses are completed. Final examinations will thus be given at various times throughout the year, and a comprehensive examination covering the interrelations of the various subjects studied will be given at the end of the year. No new subjects or additional hours of work for the students are involved in the shift.

The Thayer School offers a two year course in civil engineering which is preceded by a three year course in the liberal arts at Dartmouth College.

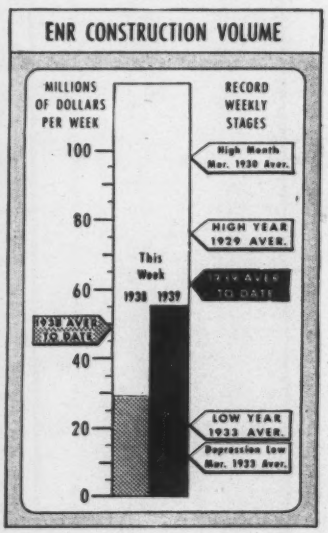
CONTRACTS AND CAPITAL

ENGINEERING construction awards for the week, $55,425,000, are 90 per cent higher than in the corresponding 1938 week, but are 34 per cent below the high volume of last week.

This week's total brings 1939 construction to $1,474,781,000, an increase of 28 per cent over the $1,153,739,000 reported for the initial 24-week period last year.

Private construction for the week records a 43 per cent gain over the 1938 week, but is 46 per cent below a week ago. Public awards are 106 per cent higher than a year ago, but 31 per cent under a week ago.

An $11,000,000 contract for cement for Shasta Dam in California brings earthwork and drainage to its second highest week of the year, slightly below the high level of a week ago. All classes of construction exceed their respective volumes in the 1938 week. Comparisons with the totals of a week ago, however, show streets and roads the only group to register a gain. Seven large lettings in five states are responsible for this increase.



New capital for construction purposes for the week, $10,532,000, is 23 per cent under the 1938 week. The current week's total is made up of $6,642,000 in state and municipal bonds, and $3,890,000 in corporate security issues.

New construction financing for the year to date, $900,268,000, is 18 per cent above the volume for the corresponding period last year.

CONTRACTS

(Thousands of dollars)

	Week Ending June 16 1938	June 8 1939	June 15 1939
Federal	$338	$15,644	$15,495
State & Municipal	21,434	49,458	29,344
Total public	$21,772	$65,102	$44,839
Total private	7,415	19,538	10,586
TOTALS	$29,187	$84,640	$55,425
Cumulative 1939 (24 weeks)			$1,474,781
1938 (24 weeks)			$1,153,739

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1938 24 Wk.	1939 24 Wk.
NON-FEDERAL	$675,112	$588,841
Corporate securities	179,728	125,015
State & Mun. bonds	318,458	307,368
R.E.A. loans	400	37,801
R.F.C. loans	63,420	2,431
P.W.A. allotments	2,036	...
U.S.H.A. loans	111,070	116,226
FEDERAL	$86,532	$311,427
TOTAL CAPITAL	$761,644	$900,268

FHA MORTGAGES

	Week Ending June 11 1938	June 3 1939	June 10 1939
Selected for appraisal	$22,808	$19,430	$23,950*
Cumulative 1939 (23 weeks)			$532,541*
1938 (24 weeks)			$400,019

*Subject to revision.

ENR INDEX NUMBERS

Index Base		1913	1926
Construction Cost	June	235.02	112.97
Building Cost	June	196.41	106.17
Volume	May	232	102

MEN AND JOBS

ALFRED RHEINSTEIN, chairman of the New York City Housing Authority, has resigned as commissioner of housing and buildings to devote all his time to the city's slum-clearance and low-rent-housing program activities.

WILLIAM R. WOOTEN has been appointed city engineer of Tulsa, Okla., to succeed M. C. SHIBLEY, who recently resigned to join the Oklahoma State Highway Commission. PAUL GULLEY will be first assistant city engineer.

J. C. BAKER, former Arkansas state highway director, has been named district maintenance engineer with headquarters at Hope, Ark. He succeeds CHARLES O. THOMAS, who resigned to become city engineer at Hope.

A. A. BAUSTIAN, assistant administrative engineer in charge of secondary roads for the Iowa State Highway Commission, has been appointed central district engineer for the commission, the position left vacant by the death of W. F. Beard. Baustian began work with the highway commission in 1918 in the drafting department and has since been engaged in survey, construction and maintenance work for the commission.

JOHN D. SPINKS, assistant WPA administrator for North Carolina, resigned June 1 to return to a consulting engineering practice in Winston-Salem.

E. B. GIBBS, resident engineer for the North Carolina highway department at Oxford, has been transferred to Durham.

JOHN CLEVENGER and I. E. GOODMAN have opened a pipeline contracting business in Alma, Mich.

THE FOLLOWING appointments have been made in the Pennsylvania highway department: ROSCOE A. DAVIDSON, district bridge engineer in Scranton District No. 4; JOHN M. DUFF, district permit engineer in Pittsburgh District No. 11; ROBERT WOOD, JR., mine survey engineer in Uniontown District No. 12.

CAPT. FRANCIS H. FALKNER will join the Huntington, W. Va. U. S. Engineer Office early in August. LIEUT. GEORGE KUMPE also will take over duties there soon.

JACK DODD has been appointed Adams County (Wash.) road engineer succeeding A. G. WAGNER who has joined the engineering staff at Grand Coulee Dam.

A. PERRY BANTA has been appointed assistant professor of sanitary engineering at the California Institute of Technology, Pasadena. He will continue to be an assistant engineer of the Los Angeles County Sanitary District.

PLUMMER WELLS has been appointed chemist, and P. S. STEFFENSON superintendent of the water treatment plant at Aberdeen, S. D. R. E. MATTHEWS who formerly held both positions, is now with the division of sanitary engineering of the South Dakota state board of health.

MILO F. OHR, senior engineer, PWA, Chicago, has been appointed supervising engineer for the PWA on the water supply pipe line from Lake Michigan to Grand Rapids, Mich.

O. R. LUNN is now associate engineer with the U. S. Engineer Seattle office. Before his transfer, he was chief designer on Mud Mountain Dam.

C. JOHN ANDERSON has been chosen city engineer of Marshalltown, Iowa, to succeed FRED S. NAIDEN, who died recently.

JAMES R. CAVANAUGH has resigned as general WPA supervising engineer in charge of three projects to bottle up a coal mine fire at New Straitsville, Ohio.

HARRY N. JENKS of Palo Alto, Calif., has been appointed senior sanitary engineer for the California state division of architecture. He will direct the design of five sewage treatment plants for state institutions.

JOHN R. AUSTIN, formerly superintendent of the Lawrence adit of the Colorado River aqueduct, has been appointed general superintendent of the new drainage tunnel to be driven into the Cripple Creek, Colo. mining district.

E. A. WOOD is now city planning engineer of Dallas, Texas.

JOHN E. BELLIVEAU, assistant chief engineer of highways for Nova Scotia since 1921, is now chief engineer succeeding R. W. MCCOLOUGH, who has become deputy minister of highways and public works.

ERDIS ROBINSON, Columbus, Ohio, has been named chairman of the State Building Authority's governing board. The board has announced it will begin collection of data for a court test of the constitutionality of the Building Authority act.

R. W. MCCOLOUGH, for the past 16 years chief engineer of the Nova Scotia highway department, has been appointed deputy minister of highways and public works for that province. J. E. BELLIVEAU, assistant chief engineer, has been made chief engineer. The appointments follow the consolidation of the highways and public works departments.

CLAUDE DRAPER has been appointed city engineer of West Lafayette, Ind.

J. S. LONG has been transferred by the Reconstruction Finance Corp. from his Washington post to the Pennsylvania Turnpike Commission where he will serve as engineer in charge of construction. A graduate of the Sheffield School of Engineering at Yale University, Long has been serving with the R.F.C. for the past year and earlier was with PWA and the War Department. He has been in the federal service since 1921.

MEETINGS

SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION, annual meeting, Pennsylvania State College, State College, Pa., June 19-23.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30.

NATIONAL COUNTY OFFICERS ASSOCIATION, annual convention, Ogden, Utah, July 17–19.

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual convention, San Francisco, July 26-28.

FIFTH International Conference on Timber Utilization, Zurich, Switzerland, Aug. 29–31.

REGIONAL AND LOCAL

PENNSYLVANIA SEWAGE WORKS ASSOCIATION, annual conference, Home Economics Building, State College, June 26–28.

ASSOCIATED GENERAL CONTRACTORS, North and South Carolina branches, summer convention, Myrtle Beach, S. C., July 21-22.

WASHINGTON State Assn. of County Engineers, Wenatchee, June 22–24.

MINNESOTA Section, A.W.W.A., Duluth, Aug. 24–25.

CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

SEWAGE WORKS, MASS.

OWNER: Town of Mansfield, Mass.; Frank A. Barbour, Boston, engineer.

PROJECT: Construction of an outfall sewer and a sewage treatment plant located 1½ mi. south of the center of the town. Treatment plant consists of an Imhoff tank, secondary settling and a trickling filter. Stipulated contract time is 250 calendar days. Transportation facilities by rail and highway are available.

BIDS: Five bids were received Feb. 23, 1939, ranging from the contract low of $105,415 to $122,700. Minimum labor rates are as follows: skilled, $1.00 per hr.; semi-skilled, 60 c. per hr.; common, 50 c. per hr.

LOW BIDDERS:

1. Middlesex Construction Co. Inc., Framingham, Mass. (contract) $105,415
2. C. Reppucci & Son, Boston, Mass..... 110,343
3. John MacDonald Construction Co., Newton, Mass. 121,969

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Earth exc., trenches	2,800 c. y.	$1.45	$1.50	$2.00
2. Earth exc. above El. 103	9,400 c. y.	1.65	1.10	1.00
3. Earth exc. below El 103	600 c. y.	4.40	3.50	5.00
4. Earth exc., drain ditch	1,900 c. y.	.50	1.00	1.00
5. Earth exc., borrow pit	1,000 c. y.	.30	.35	.50
6. Loam	1,000 c. y.	1.50	2.50	1.50
7. Excav., entrance road	600 c. y.	.35	.60	1.00
8. Rock excav	50 c. y.	5.00	6.00	1.00
9. Concrete 1/6 mix	980 c. y.	19.00	18.00	24.00
10. Concrete 1/8 mix	110 c. y.	9.00	11.00	22.00
11. Protect. coat on concrete	300 s. y.	.40	1.70	3.00
12. Reinf. steel	48,000 lb.	.04	.06	.05
13. Brick masonry, manholes	30 c. y.	25.00	30.00	40.00
14. 4-in Tar ctd. c. i. pipe	660 l. f.	.70	.90	.85
15. 6-in. Cem. lin. c. i. pipe	2,700 l. f.	1.15	1.38	1.30
16. 8-in. Tar ctd. c. i. pipe	170 l. f.	1.45	1.69	1.65
17. 12-in. Tar ctd. c. i. pipe	150 l. f.	2.50	2.57	2.75
18. 16-in. Tar ctd. c. i. pipe	440 l. f.	3.75	3.77	5.00
19. C. I. bds fittings	11.5 ton	120.00	140.00	185.00
20. C. I. flgd. pipe fittings	0.8 ton	170.00	175.00	225.00
21. C. I. tr. fil. and distr	L.S.	3,500.00	3,950.00	4,500.00
22. 8-in. C. I. sludge piping	L.S.	260.00	325.00	500.00
23. 3-in. C. I. sludge agit. piping	L.S.	275.00	275.00	400.00
24. Flush. conn. complete	2 ea.	32.00	40.00	50.00
25. Fire hydrants	3 ea.	82.00	83.00	100.00
26. Flush hydrants	4 ea.	44.00	88.00	50.00
27. Gate valves, etc	L.S.	1,100.00	1,456.00	1,200.00
28. 6-in. Vit. pipe	40 l. f.	.45	.30	.50
29. 18-in. Vit. pipe	2,680 l. f.	1.30	1.70	2.00
30. Sludge bed undr. system	L.S.	295.00	625.00	600.00
31. Trickling undr. system	L.S.	900.00	825.00	1,200.00
32. 8-in. Vit. pipe subdrs	800 l. f.	.65	1.20	1.00
33. 6-in. conc. pipe	250 l. f.	.40	.60	1.00
34. 10-in. concrete pipe	140 l. f.	.50	.70	1.00
35. 12-in. Rein. conc. pipe	50 l. f.	1.05	1.20	2.00
36. 12-in. Pl. conc. pipe	310 l. f.	.55	1.10	1.25
37. 18-in. Pl. conc. pipe	45 l. f.	1.50	1.60	2.00
38. 24-in. Rein. conc. pipe	50 l. f.	3.00	3.00	4.50
39. Trickling fil. crushed stone	3,400 c. y.	3.00	3.20	3.25
40. Sludge bed filtering mat	280 c. y	1.50	2.50	3.25
41. Adm. bldg., superstructure	L.S.	6,200.00	8,100.00	7,500.00
42. Sludge pump house superstruc.	L.S.	2,000.00	2,500.00	2,800.00
43. Elec. system, complete	L.S.	1,800.00	2,500.00	2,400.00
44. Creo. timber	1M fbm	50.00	125.00	150.00
45. Venturi meter	L.S.	1,400.00	1,400.00	1,600.00
46. Adj. closing siphon	L.S.	930.00	950.00	850.00
47. Filter nozzles	L.S.	425.00	450.00	475.00
48. Two 15-in comm. mechanisms	L.S.	4,900.00	4,200.00	4,350.00
49. Second. tank slu. pump	L.S.	650.00	925.00	900.00
50. Water meter	L.S.	125.00	105.00	125.00
51. Copper water stops	160 l. f.	.35	.70	.25
52. Lead fl. sheets for Imhoff tank	L.S.	200.00	25.00	50.00
53. Misc. steel	L.S.	1,700.00	100.00	1,000.00
54. Misc. iron castings	L.S.	700.00	590.00	500.00
55. Screens in cl. tank, etc	L.S.	1,700.00	1,690.00	1,500.00
56. Rubble paving, drainage ditch	40 c. y.	4.50	2.50	3.00
57. Asphalt road repairs	L.S.	50.00	40.00	100.00
58. Macadam road	1,300 s. y.	.25	.55	1.00
59. Granolithic walks	270 s. y.	1.25	1.35	2.70
60. Wood guard rail	1,100 l. f.	.50	.55	.45
61. Chain link fence, tr. plant	L.S.	2,000.00	1,675.00	1,875.00
62. Chain link fence, roadway	1,125 l. f.	1.15	1.15	1.25
63. Chain link gate	L.S.	60.00	86.00	100.00
64. Grassing	1.7 acre	100.00	300.00	300.00

INTERCEPTING SEWER, WIS.

OWNER: City of Wausau, Wis.; J. Donohue Engineering Co., Sheboygan, Wis., engineers.

PROJECT: Construction of east side interceptor sewer No. 5 and sewer pipe for the same. The project consists of construction of an intercepting sewer along the left bank of the Wisconsin River, including two river crossings, one an 18-in. and the other a 30-in. one, a rock tunnel section 1,350 ft. long, and a transition section 260 ft. long. The remainder of the pipe line is laid in soil consisting mainly of compacted gravel and sand.

CONDITIONS: Owner furnished sewer pipe, delivered to the job. No bids were received on alternate of monolithic concrete sewer for 42-in. and 48-in. sizes. A condition affecting cost is presence of granite ledge rock which must be tunneled in order to provide connections for various sewer outlets that now discharge directly into the Wisconsin River. The common wage scale set forth in the specifications, recognized by PWA and approved by the city of Wausau, is 50c per hr. Semi-skilled wages will range from 65c. to 85c. per hr. Skilled rates will run from 65c. to $2.00 per hr., the highest classification being for divers. A 100-per cent performance bond is required.

BIDS: Three bids were received Mar. 9, 1939, ranging from the contract low of $433,511 to $532,030.

LOW BIDDERS:

1. United Construction Co., Green Bay, Wis. (contract) $433,511
2. Chas. A. Green & Son, Appleton, Wis..... 464,141
3. Thornton Bros. Co., St. Paul, Minn..... 532,030

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Control Sta. No. 6	L.S.	$1,500.00	$1,200.00	$2,000.00
2. Control Sta. No. 7	L.S.	2,000.00	2,150.00	3,000.00
3. Control Sta. No. 8	L.S.	1,650.00	1,500.00	2,500.00
4. Control Sta. No. 9	L.S.	1,650.00	1,700.00	1,800.00
5. 6x6-ft. sewer	1,350 ft.	38.50	45.00	65.00
6 6x6-ft. transition sect	260 ft.	55.00	50.00	75.00
7. 48-in. sewer	1,900 ft.	39.50	43.00	45.00
8. 42-in. sewer	2,450 ft.	26.00	31.75	25.00
9. 36-in. sewer	1,500 ft.	24.50	25.00	16.00
10. 30-in. sewer	3,570 ft.	7.80	9.00	8.00
11. 27-in. sewer	200 ft.	11.25	10.00	10.00
12. 21-in. sewer	1,600 ft.	8.50	3.00	2.00
13. 18-in. sewer	2,340 ft.	12.75	14.00	15.00
14. 15-in. sewer	1,200 ft.	3.50	8.00	10.00
15. 12-in. sewer	740 ft.	4.50	4.00	8.00
16. 10-in. main sewer	680 ft.	3.00	3.50	10.00
17. 10-in. C.B. conn. sewer	100 ft.	2.00	3.00	2.50
18. 8-in. sewer	1,175 ft.	3.00	2.50	10.00
19. 8-in. C.I.P. sewer	360 ft.	6.75	10.00	40.00
20. 6-in. Service conn	800 ft.	1.50	2.00	2.00
21. 6-in. Risers (72)	550 ft.	1.50	2.00	2.00
22. 30-in. River crossing	L.S.	22,500.00	20,000.00	22,500.00
23. 18-in. River crossing	L.S.	29,000.00	25,000.00	42,740.00
24. Rock excav. manhole	120 c. y.	12.00	14.00	10.00
25. Rock excav.	2,700 c. y.	7.00	7.00	10.00
26. Rock excav	500 c. y.	15.00	16.25	12.00
27. Manholes (68)	1,080 l. f.	7.00	8.25	10.00
28. Manhole drops (23)	220 l. f.	5.00	6.15	5.00
29. Stormwater outlet	L.S.	1,250.00	1,100.00	1,000.00
30. 18-in. Pipe cradle	1,000 ft.	0.75	1.00	1.20
31. 15-in. Pipe cradle	1,000 ft.	0.65	0.60	1.00
32. 12-in. Pipe cradle	800 ft.	0.50	0.60	0.75
33. 10-in. Pipe cradle	300 ft.	0.50	0.60	0.70
34. Cr. stone found., 48-in. pipe	100 ft.	0.30	0.40	0.70
35. Cr. stone found., 36-in. pipe	300 ft.	0.20	0.40	0.80
36. Cr. stone found., 30-in. pipe	1,000 ft.	0.20	0.40	0.50
37. Cr. stone found., 18-in. pipe	500 ft.	0.20	0.35	0.40
38. Sheeting left in place	20 M fbm	0.04	0.03	0.05
39. Underdrain, 36-in	500 ft.	0.50	0.60	2.20
40. Underdrain, 30-in	800 ft.	0.50	0.60	2.00
41. Underdrain, 18-in	500 ft.	0.20	0.35	1.50
42. Underdrain, 15-in	500 ft.	0.20	0.30	1.40
43. Underdrain, 12-in	200 ft.	0.20	0.30	1.25
44. Class C concrete	25 c. y.	15.00	12.75	40.00

CONSTRUCTION REPORTS

Compiled by BUSINESS NEWS DEPARTMENT
Engineering News-Record, 330 W. 42nd St., New York
ELSIE EAVES, MANAGER
(Daily service also available—Write for details)

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

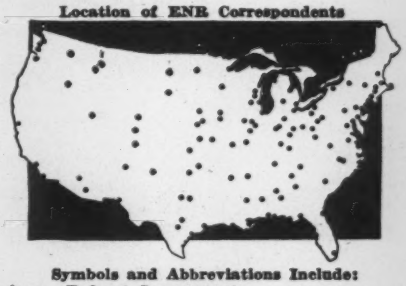
Classes of Construction
(Named in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges, Grade Cross'gs
Streets & Roads
Earthwork, Waterways
Unclassified
Materials, Equipment
Public Buildings
Commercial Buildings
Industrial Buildings

Stages Reported

PROPOSED: (except Streets & Roads); BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR); LOW BIDDERS ($500,000 projects and over); CONTRACTS AWARDED

Location of ENR Correspondents



Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD McGraw-Hill Construction Daily

WATER SUPPLY

PROPOSED WORK

Calif., San Francisco—Municipal Water Dpt., expending $100,000 replacing pipe lines at Redwood City and South San Francisco, and $195,400 for imprvg. existing lines, and extending service to new homes and sub-divisions.

Calif., Ventura—Rejected bids of May 22, reservoir roof and 16 in. welded steel bypass pipe line, etc. Over $15,000. Will be re-advertised. C. Froerer, City Hall, engr. CD 4/26—ENR 5/4.

Ill., Greenville—City water softening plant. About $15,000.

Ind., Huntington—Bd. P. Wks., F. E. Cutshall, chn., City Hall. WW and light plant. $145,000. Lennox & Matthews, 833 Architects & Builders Bldg., Indianapolis, consult. engrs.

Mass., Housatonic — Housatonic Water Works Co., slow sand water filtration plant, earth and concrete work. Over $15,000. S. M. Ellsworth, 12 Pearl St., Boston, engrs.

N. J., Hackensack—Bd. Choosen Freeholders Bergen Co., Administration Bldg., storm water drains, manholes, catchbasins, at various county roads, $36,709. R. P. McClave, Administration Bldg., Hackensack, engr.

N. Y., Buffalo—Erie County Parks Comn., County Bldg., extending water supply sys. Ellicott Creek Park, incl. constructing chain link fence. Over $15,000. **Maturity soon.**

O., McGuffey — Village, election $14,000 bonds for municipal waterworks sys. Over $15,000. J. J. Wilson, mayor.

★**O., Toledo**—City, application will be submitted soon to WPA for approval of funds, watermain imprv. $500,752. W. F. Harris, dir. P. Service.

Tex., LaMarque—Galveston Co. Fresh Water Supply Dist. No. 2, B. Iselman, pres., defeated bonds WW sys., incl. 700 ft. well. $70,000. H. G. Olmsted, Dist. No. 2, Bd. engr. CD 2/17—ENR 2/23.

Alta., Hanna—J. H. Stephens, engr., Hanna, bids soon tower, tank and water sys. for town. $100,000. CD 4/19—ENR 4/27.

B. C., Vancouver — E. A. Cleveland, ch. comr., Greater Vancouver Water Dist., bids soon water services, incl. 16 Ave. main in part. $195,000.

Ont., Wingham—Well drilling. P. Utilities Comn., Wingham, engrs.

BIDS ASKED

Bids Asked June 19

Me., York Village—York Water Dist., J. H. Lucas, supt., chlorinating station. $15,000. PWA. M. Pirnie, 25 W. 43 St., New York, engr.

Bids Asked June 22

Wash., Seattle—Bd. P. Wks., c.i. water mains in Warren Ave., et. al. $115,000. C. L. Wartelle, County-City Bldg., engr.

Ont., Perth—Gore & Storrie, engrs., 1130 Bay St., Toronto, elevated steel water tank, 150 ft., for town. CD 6/3/38—ENR 6/9/38.

Bids Asked June 23

Mass., Housatonic—Housatonic Water Works Co., slow sand filtration plant, incl. earth and concrete work (Merriman type cement specified). Over $15,000. S. M. Ellsworth, 12 Pearl St., Newton, engr. CD 6/7.

Bids Asked June 29

Mass., Boston—At office Metropolitan Dist. Water Supply Comn., R. N. Molt, secy., 20 Somerset St., Contr. 91, furnishing, delivering gate valves, appurtenances, gate hoists for Weston Aqueduct, Framingham, est. $3,000. PWA, K. R. Kennison, ch. engr. Comn.; adv. ENR 6/15.

Bids Asked June 30

Calif., Calistoga—Municipal water supply storage dam, Kimball Creek. Over $25,000. C. C. Kennedy, 604 Mission St., San Francisco, consult. engr.

Bids Asked July 12

O., Toledo—W. F. Harris, dir. P. Service, 210 Safety Bldg., water intake conduit and crib for Lake Erie Water Project; adv. ENR 6/15.

Bids Asked

Calif., Fallbrook—Directors Fallbrook Public Utility Dist., pump. plant building, pumping plant fittings, main pipeline fittings, gate, air and check valves, chlorination equip, etc.

Calif., Inglewood—Drilling water well.

Neb., Lincoln — City, water distribution imprv. PWA. $20,000. D. L. Erickson, city engr.

CONTRACTS AWARDED

Calif., Sacramento—E. Hyatt, state engr., 401 P. Wks. Bldg., drilling 27 wells, more or less, San Luis Rey Valley, to M. R. Peck, 16,800 S. Main St., Gardina, for State. **$3,674.** Bids 6/7. CD 6/1.

Ia., Menlo—Distribution sys. to Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, Ia. **$22,793.** Bids 5/17 CD 5/9 ENR 5/11.

Kan., Kansas City—Bd. P. Utilities, crane for WW imprv. to Harnischfeger Corp., 4400 W. Natl. Ave., Milwaukee, Wis., **$5,765**, control equipment to Continental Electric Co., 1517 Oak St., Kansas City, Mo., **$43,158.** Bids 5/31. CD 5/22—ENR 5/25.

Kan., Topeka—Soldier Twp. waterworks distribution sys. to W. B. Carter, Wichita, **$32,-104.** Bids 6/1. CD 5/25.

★**Neb., Omaha**—Metropolitan Utilities Dist. 17th and Harney Sts., Omaha, water and gas mains, WPA. **$760,000.** J. C. Detweiler Const. engr.

N. Y., Binghamton—Pump. sta. renovation, to Turbine Equipt. Co., 75 West St., New York. **$201,615. PWA.** Barker & Wheeler, 36 State St., Albany, engrs. Part of WW rehabilitation project. CD 6/6—ENR 6/8.

N. Y., Elmira—Water Bd., City Hall, c.i. water pipe line Upper Lake St., McCanns Blvd. Own forces. Over **$15,000.** Furnishing 4,300 ft. c.i. pipe, to Central Foundry Co., 420 Lexington Ave., New York, **$1.77** per lin. ft. CD 3/3—ENR 3/9.

N. Y., South Corning—Installing c. i. watermains, constructing pump house, Canton St. **WPA.** Over **$15,000.**

N. Y., Tonawanda—Constructing water supply lines. **WPA.** Over **$25,000.**

O., Marietta—City Waterworks Contr. F service building to Bever & Morris, Inc., Blackstone Bldg., Cleveland, **$50,473.** Bids 5/20. CD 5/15.

Tex., Daingerfield—City, C. S. Truitt, mayor, water and sewer sys. incl. c.i. pipe, etc., to E. E. Barrow, Inc., 1518 Kings Highway, Dallas. **$50,487.** Bids 2/17. CD 2/2—ENR 2/9.

Va., Fredericksburg—Addns and imprvs. to filter plant to W. C. Spratt, Fredericksburg. PWA. Bids 5/23. CD 5/18.

Wash., Auburn—Replacing wood stave pipe with c.i. pipe, etc., **WPA. $16,311.** J. L. Fallgreen, City Hall, engr. CD 3/20—ENR 3/23.

Wash., Seattle—Bd. P. Wks., watermains in W. Garfield St., et al., to N. Coluccio & Co., 844 W. 48 St., **$72,654.** Bids 5/25. CD 5/19.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Ky., Strathmoor Village (Louisville, P. O.)—C. B. Jenkins, 410 S. 5 St., Louisville, chn. Strathmoor Sewer Com., sewage disposal plant. $30,000. Engineer not appointed.

Mass., Monson—Commonwealth of Massachusetts, Dpt. Mental Health, Dr. C. T. Perkins, comr., 100 Nashua St., Boston, sewage tr. plant, Imhoff tank, trickling filter. Est. $60,000. B. F. Snow, 14 Beacon St., Boston, engr.

Mo., Springfield—Rejected bids June 6, trickling filter sys. in connection with sewage disposal plant addn. Total est. $400,000. PWA. Will readvertise. Black & Veatch, 4706 Bway., Kansas City, Mo., engrs. CD 5/29—ENR 6/1.

N. Y., Niagara Falls—Sewer and water lines, 71 St., est. $14,019; Maple Ave., est. $2,563; Monroe Ave., est. $4,000; 2 alleys, est. $3,500. Total est. $24,082. G. J. Rickert, City Hall, city clk. W. D. Robbins, city mgr.

N. Y., Schenectady—City Council, sanitary sewers, Albany St. Over $25,000. L. C. Purdy, city engr.

O., Canton—City, storm water sewer in North Market Heights Sect. $55,465. J. A. Shisler, city engr.

O., Cleveland—City, C. B. Patterson, purch. agt., bids soon, exten. sludge beds, chutes, unloading platform, auxiliary equip. for handling sludge cake at southerly sewage plant.

O., Ripley—Village, plans abandoned, sewage sys. and plant. $186,000. A. R. Games, mayor. CD 5/5—ENR 5/11.

O., Waverly — Village, C. P. Gableman, mayor, sewage sys. and plant. PWA. $77,000. H. Martin, P. O. Box 441, Portsmouth, engr.

Pa., Forty Fort—Storm and sanitary sewers, W. Pettebone, Wesley, Dana, Oak and Tripp Sts. Est. $25,000-$30,000. Boro Engineering Dpt., Boro Hall, engrs.

Ont., Georgetown—Ratepayers defeated proposal sewerage sys. CD 5/17—ENR 5/25.

BIDS ASKED

Bids Asked June 20

★**Ia., Waterloo**—City sewage plant. $722,-000. C. T. Wilson, city engr.

Bids Asked June 21

Mo., University City (St. Louis P. O.)—A. J. Schopp, acting city clk., joint sewer, Canton-Hanley Joint sewer dist. $119,460. Horner & Shifrin, International Office Bldg., St. Louis, engrs. W. Heimbuecher, City Hall, 6801 Delmar Blvd., University City, city engr.

N. J., Newark—Passaic Valley Sewage Comn., 24 Branford Place, Newark, furnishing, installing complete oil burner sys. at Newark Bay Pumping station, Wilson Ave. J. R. VanDruyne, 24 Branford Place, Newark, engr.

Bids Asked June 22

N. Y., Long Island City—President Queens Boro, Queens Subway Bldg., 21-10 49 Ave., sewer and appurtenances, Grand Central Parkway Ext., 83, 176 and 224 Sts.

N. Y., St. George—President Richmond Boro, Boro Hall, sanitary sewer, Greeley Ave., Buel Locust and Elmwood Aves., furnishing, delivering materials and equipment rental for same.

HIGHWAY BRIDGE AND APPROACHES, WEST VIRGINIA

OWNER: State Road Commission, Charleston, W. Va.; W. C. Dick, engineer.

PROJECT: Construction of Pleasant View Bridge (No. 1547) and approaches, 1 mile north of Middlebourne on State Route 18, in Tyler County. Project includes erection of two 55-ft. and one 60-ft. I-beam spans on concrete substructure, and grading, draining, macadam base and surface treatment.

CONDITIONS: Construction to start not later than 5 calendar days after date of award, and to be completed within 100 working days. Materials to be furnished by contractor. B. & O. R.R. passes through Sisterville, 11 miles from project site. Prevailing wage rates are: skilled, $1.00 per hr.; semi-skilled, 50 c. per hr.; and common, 40 c. per hr.

BIDS: Five bids were received on April 11, ranging from $36,508 to $44,429. Contract was awarded to the low bidder on May 24.

LOW BIDDERS:

1. C. C. Dodd Constr. Co., Spencer, W. Va..... $36,508
2. Sun Constr. Co., Benwood, W. Va..... 36,871
3. Fuccy Bros., Weston, W. Va..... 40,964

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Dry excav	700 c. y.	$2.50	$0.80	$1.00
2. Wet excav	70 c. y.	4.00	2.00	5.00
3. Rock excav	50 c. y.	6.00	4.00	6.00
4. Cl. A conc.-super	135 c. y.	20.00	17.30	21.00
5. Cl. B conc.-sub	92 c. y.	18.00	17.25	20.00
6. Cl. B conc	266 c. y.	15.80	16.75	18.00
7. Conc. railing	347 l. f.	3.80	4.20	3.00
8. Reinf	39,756 lb.	.045	.04	.0425
9. El. weld. wire fabric	2,070 lb.	.08	.06	.10
10. Steel superstruct	L.S.	8,900.00	7,461.00	9,000.00
11. Bit. waterproofing	17 s. y.	1.00	.55	1.50
12. Clear rt. of way	2,100 l. f.	.02	.04	.05
13. Unclass. excav	15,800 c. y.	.35	.58	.60
14. Overhaul	25,000 st. y.	.01	.015	.02
15. Struct. excav	180 c. y.	1.00	1.25	1.50
16. Macadam base	1,085 c. y.	4.50	4.40	4.50
17. Surf. aggr. limestone	220 tons	3.50	3.70	4.00
18. Tar, prime	2,000 gal.	.17	.13	.20
19. Tar, seal	4,000 gal.	.17	.13	.20
20. Paved or coated pipe	64 l. f.	2.20	2.10	2.50
21. Rein. conc. pipe	230 l. f.	2.00	1.90	2.25
22. Cl. B conc	10 c. y.	16.00	17.00	20.00

PAVING AND STREETS, CHICAGO, ILLINOIS

OWNER: City of Chicago, Board of Local Improvements, J. P. Boyle, president; Arthur Engh, engineer.

PROJECT: Paving on South Laramie St., from Roosevelt Road to Lexington St. on a grade separation project. Total length about ½ mi. Includes concrete pavement, sidewalks, excavation, embankments, curb and gutter.

BIDS: Nine bids were received Apr. 14, 1939 ranging from the contract low of $99,110 to $107,004. Labor rates are as follows: skilled, $1,625 per hr.; common, $1,025 per hr.

LOW BIDDERS:

1. Robert R. Anderson Co., Chicago (contract).. $99,110
2. James A. Sackley, Chicago..... 99,978
3. Thomas McQueen, Chicago 100,903

Items	Quan.	Unit Prices (1)	(2)	(3)
1. Earth excav	5,800 c. y.	$1.28	$1.48	$1.75
2. Embank (crushed limestone and cinders)	700 c. y.	1.90	1.24	2.00
3. Rock excav	50 c. y.	3.00	5.50	3.00
4. Embank. (Limestone screenings)	20,300 c. y.	1.59	1.77	1.80
5. P.C.C. Pav. 8-in	7,700 s. y.	1.92	1.88	1.92
6. P.C.C. Pav. (Spec. reinf. slab. var. thickness)	116 s. y.	2.61	2.64	2.50
7. Pavement fabric	7,700 s. y.	.21	.20	.16
8. P.C.C. sidewalks (reinf.)	22,750 s. f.	.35	.30	.25
9. P.C.C. sidewalks (plain)	7,150 s. f.	.28	.25	.25
10. 8-in. storm sewers (3' to 12' cover)	380 l. f.	1.60	1.60	1.50
11. 48-in. conc. catchbasins (type 5 frames & open lids)	8 ea.	132.00	140.00	150.00
12. Catchbasins, adjusting	2 ea.	18.00	18.00	10.00
13. 36-in. manholes (type 1 frame & closed lid)	1 ea.	190.00	99.00	200.00
14. Type 1 frame & closed lid	2 ea.	17.00	18.00	15.00
15. Conc. gutter type 1	530 l. f.	1.16	1.08	1.60
16. Conc. gutter type 5	32 l. f.	1.34	1.23	5.75
17. Conc. curb & gutter type 2 (white cement curb)	60 l. f.	1.36	1.33	1.20
18. Comb. conc. curb & gutter type 3	1,140 l. f.	.93	.86	.80
19. Comb. conc. curb & gutter type 3 (white cement curb)	2,020 l. f.	1.30	1.29	1.20
20. Class X conc. retain. wall	16 c. y.	30.00	19.80	35.00
21. Reinf	51,400 lb.	.05	.055	.05
22. Catchbasins adj. (incl. type 5 frames open lids)	2 ea.	31.00	36.00	20.00
23. Manholes, reconst	2 ea.	60.00	37.50	65.00
24. Ctr. curb type "A" (white) precast	550 l. f.	6.96	6.40	7.00
25. Ctr. curb marker type "D" (black) precast	550 l. f.	.91	.92	1.00
26. Traffic marker type "G" (black & white) precast	350 l. f.	7.25	6.05	5.30
27. Lane marker type "C" (black) precast	1,840 l. f.	1.10	1.11	.95
28. Long bit. premolded exp. jt	1,100 s. f.	.30	.20	.20
29. Comb. conc. curb & gutter type 4	110 l. f.	1.20	1.23	1.00
30 Std. portland cement	3,860 bbls.	2.35	2.30	2.20
31. White portland cement	70 bbls.	8.80	8.10	7.00
32. Top soil	700 c. y.	2.25	1.95	2.00
33. Ctr. curb type "B" (white) poured in place	40 l. f.	18.00	2.90	20.00
34. Fill. exist. catchbasins	9 ea.	5.00	11.00	4.50
35. P.C.C. sidewalks (spec. reinf. conc. slabs)	715 s. f.	.42	.46	.30

HIGHWAY BRIDGES AND CULVERTS, WYOMING

OWNER: Wyoming State Highway Commission; J. G. Smith, Rock Springs, district engineer.

PROJECT: Constructing one I-beam and 13 treated timber bridges, 19 reinforced concrete culverts, etc., on 17.576 miles of Big Piney-Kemmerer Road, beginning 20 miles north of Kemmerer, in Lincoln and Sublette counties. Stipulated contract time is 100 working days, commencing 20 days after notice of award. Transportation facilities are by rail to Kemmerer and by highway to the site. The bridge contractor was required to bid on and construct items that are ordinarily done by the grading man. This is due to drainage conditions needing immediate attention at the site of the structure.

BIDS: Three bids were received Apr. 11, 1939, ranging from the contract low of $86,850 to $99,698. Labor rates are as follows: skilled, 80 c. per hr.; semi-skilled, 65 c. per hr.; common, 55 c. per hr.

LOW BIDDERS:

1. W. W. Clyde & Co., Springville, Utah (contract) $86,850
2. Etlin E. Peterson, Casper, Wyo..... 98,877
3. Inland Construction Co., Omaha..... 99,698

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excav	29,300 c. y.	$0.20	$0.24	$0.35
2. Watering	120 M gal	1.50	2.00	3.00
3. Roller operat	120 hr.	2.00	2.50	5.00
4. Struct. excav	800 c. y.	1.00	1.20	1.10
5. Excav. culv	150 c. y.	.75	1.20	.60
6. Dry excav. bridges	280 c. y.	1.00	1.50	2.09
7. Wet excav. bridges	260 c. y.	3.00	5.00	4.00
8. Mech. tamping	1,040 hr.	2.00	2.50	2.50
9. Cl. A conc	1,363 c. y.	18.00	24.50	20.00
10. Cl. AA conc	110 c. y.	20.00	24.50	22.00
11. Reinf	141,370 lb.	.047	.05	.05
12. Struct. steel	82,550 lb.	.062	.08	.06
13. Tr. timber	210 M bm	100.00	100.00	104.00
14. Untr. timber	5 M bm	80.00	90.00	110.00
15. Tr. piling	8,224 l. f.	1.00	1.00	1.06
16. Salv. tr. timber	L.S.	500.00	200.00	200.00
17. Sp. backfill	130 c. y.	.75	2.00	2.00
18. 24-in. C.M.P	360 l. f.	2.90	2.40	2.25
19. Cl. 1 riprap	2,215 c. y.	2.50	2.00	3.00
20. Grouted rubble pav	90 s. y.	2.00	2.50	6.00
21. Remove exist. struct	L.S.	400.00	400.00	400.00
22. Pile shoes	59 ea.	3.00	5.00	4.00
23. Struct. excav	30 c. y.	1.00	1.20	2.00
24. Mech. tamping	6 hr.	2.00	2.50	2.50
25. Cl. A conc	12 c. y.	18.00	24.50	25.00
26. Reinf	800 lb.	.047	.05	.05
27. 18-in. C.M.P	16 l. f.	1.90	2.00	2.00
28. Cl. 1 riprap	5 c. y.	2.50	2.30	3.00
29. 18-in. drain gate	L.S.	30.00	30.00	30.00